

REMARKS

Claims 1-10 are pending in the present application. Claims 1, 3, 6, and 8-10 have been amended, and Claim 11 has been added, leaving Claims 1-11 for consideration upon entry of the present Amendment.

Support for the amendment to claims 1 and 6 can be found in the specification on page 5, lines 15-19, and figure 1.

Support for the amendments to claims 3 and 8 can be found in the specification on page 6, lines 1-11.

Claims 9 and 10 have been amended merely to correct minor typographical errors.

Reconsideration and allowance of the claims is respectfully requested in view of the above amendments and the following remarks.

Claim Objections

Claim 3 stands objected to as allegedly being in improper dependent form for failing to limit the subject matter of the previous claim. In particular, the Examiner states that "applicant does not specifically claim the probes in claim 2 (only that the functional groups are capable of covalently binding probes), and therefore the limitation recited in claim 3 would not further limit claim 2". Claim 3 has been amended and now recites "wherein probes are covalently bound to the compounds having functional groups and wherein the probes are proteins, nucleotides, or polysaccharides". Thus, claim 3 further limits claim 2 and further requires that the microarray comprises probes.

Reconsideration and withdrawal of the claim rejections are requested.

Claim Rejections Under 35 U.S.C. § 112, Second Paragraph

Claims 3 and 8 stand rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In particular, regarding claim 3, the Examiner states that is "unclear if applicant intended to claim the probes as well". (June 15 Office Action, page 2) As described above under claim objections, claim 3 has been amended to

positively recite the probes covalently bound to the compounds bound to functional groups.

Regarding claim 8, the Examiner states "It is unclear of the functional groups were attached to the spot regions before binding with the probes, or if they were attached as a result of binding to the probes". (June 15 Office Action, page 3) Claim 8 has been amended to clarify that the compounds containing functional groups are bound to the substrate prior to binding to the probes.

For at least the foregoing reasons, reconsideration and withdrawal of the rejections under 35 U.S.C. § 112, second paragraph, are requested.

Claim Rejections Under 35 U.S.C. § 102(b)

Claims 1-10 have been rejected under 35 U.S.C. 102(b) as allegedly being anticipated by Bao et al (Toward controllable self-assembly of microstructures: selective functionalization and fabrication of patterned spheres, December 2001, Chem. Matters, 14, 24-26). Applicants respectfully traverse this rejection.

Independent claim 1 is directed to a micorarray substrate comprising a patterned photoresist film having one or more spot regions therein, the photoresist film being detachable from the substrate, wherein the spot regions are defined by the patterned photoresist film. Independent claim 5 is directed to "a microarray comprising probes immobilized in spot regions of a microarray substrate, the microarray substrate including a detachable patterned photoresist film on which the spot regions are formed". Independent claim 6 is directed to a method of detecting a target material, comprising (a) preparing a substrate having a patterned photoresist film, the patterned photoresist film being detachable from the substrate and having one or more spot regions therein, wherein the spot regions are defined by the patterned photoresist film; (b) immobilizing probes in the spot regions to prepare a microarray; (c) contacting the probes and a sample containing the target material to react the probes and the target material; (d) detaching the photoresist film from the microarray to remove the target material nonspecifically bound to the photoresist film; and (e) detecting the reaction between the target material and the probes.

Bao et al. teaches two methods for the production of spheres comprising gold caps. In both approaches, a layer of nonconductive spheres are spin cast onto a silicon wafer. In the first method, a photoresist layer is employed to control the size of the exposed area on the sphere. The photoresist can be etched to expose the surface of the spheres for deposition of a gold cap onto the exposed sphere surface. The remainder of the photoresist can then be removed by, for example, soaking in an acetone solution. A reactive group can be attached to the exposed regions of the spheres. In another method, a monolayer of gold can be directly deposited onto spheres in a manner to leave half of the surfaces of the spheres covered. With the functionalized portion of the sphere attached to the substrate, the gold upper side of the sphere can be patterned. Single stranded DNA comprising, for example, a thiol-derivatized end group can be attached to the gold cap.

In making the rejection, the Examiner states with regard to claim 1 "Bao et al teach a substrate comprising a polished silicon wafer with a photoresist-protecting layer (p. 24, col. 2), with probes immobilized in spot regions of the substrate (p. 25, col. 2)". (June 15 Office Action, page 3) With regard to claim 6, the Examiner states "Spheres derivatized with complementary ssDNA are then added on the substrate, where bi[n]ding between complementary ssDNA strands occurs (p. 25, col. 2). Nonspecific bound spheres is removed by dissolving the photoresist layer (p. 26, col. 1)". (June 15 Office Action, pages 3-4)

Regarding claim 1, this claim is directed to a microarray substrate comprising a patterned photoresist film having one or more spot regions therein, the photoresist film being detachable from the substrate, wherein the spot regions are defined by the patterned photoresist film. Claims 5 is directed to a microarray, "the microarray substrate including a detachable patterned photoresist film on which the spot regions are formed". Claim 6 is directed to a method of making a microarray "wherein the spot regions are defined by the patterned photoresist film". Thus, in the present claims, the spot regions of the microarray are defined by the patterned photoresist film. Bao et al., in contrast, is directed to a three-dimensional substrate comprising selectively patterned spheres. As shown in Figure 1 of Bao et al., the pattern in the photoresist is defined by the spheres. Bao et al. does not teach a microarray having spot regions defined by a photoresist. The

three-dimensional substrate described in Bao et al. is not suitable as a microarray due to the particle size and shape of the spheres and the method for preparation of the three-dimensional substrate. As known to those of ordinary skill in the art, a microarray is a solid substrate having a spot region arranged in a regular array manner. In Bao et al., the photoresist is etched to randomly expose the upper portion of the spheres rather than to form regular patterns on the spheres. The three-dimensional substrate described in Bao et al. is distinct from the presently claimed microarray.

To anticipate a claim, a reference must disclose each and every element of the claim. *Lewmar Marine v. Varient Inc.*, 3 U.S.P.Q.2d 1766 (Fed. Cir. 1987). Bao et al. does not teach a microarray having spot regions defined by a patterned photoresist film and thus is missing an element of the present claims. Bao et al. thus does not anticipate present independent claims 1, 5 and 6, and the claims that depend therefrom.

Additionally, several of the claims dependent upon claim 1 can further be distinguished from Bao et al. For example, claim 2 claims "compounds having functional groups capable of covalently binding to probes are attached to the substrate in the spot regions". In Bao et al., compounds having functional groups appear to be attached to the gold-capped spheres, not the substrate. Claim 3 claims a microarray substrate "wherein probes are covalently bound to the compounds having functional groups, and wherein the probes are proteins, nucleotides, or polysaccharides". In Bao et al., the compounds having functional groups are attached to the substrate, while to gold is attached to a ssDNA probe. As known to those of ordinary skill in the art, a microarray is a solid substrate having a spot region arranged in a regular array manner. In Bao et al., the photoresist is etched to exposed to randomly expose the upper portion of the spheres rather than to form regular patterns on the spheres.

For at least the foregoing reasons, reconsideration and withdrawal of the rejections under 35 U.S.C. § 102(b) are requested.

New Claims

New claim 11 has been added to further define the invention.

Support for new claim 11 can be found in the specification on page 7, lines 20-21. Bao et al. do not teach delamination of the photoresist.

It is believed that the foregoing amendments and remarks fully comply with the Office Action and that the claims herein should now be allowable to Applicants. Accordingly, reconsideration and allowance is requested.

If there are any additional charges with respect to this Amendment or otherwise, please charge them to Deposit Account No. 06-1130 maintained by Cantor Colburn LLP.

Respectfully submitted,

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